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RESEARCH REPORT

DEVELOPMENT IN RURAL COMMUNITIES

A WIDE-REACHING programme of socio-cultural and agro-economic research has been conducted in the Que Que Tribal Trust Land in order to achieve a comprehensive understanding of problems of development by means of an analysis of the ecological variables governing the adjustment and adaption of the people and their environment. Only a few of the main findings are summarized and discussed in this article.

A THEORY OF ADAPTIVE BEHAVIOUR

Motivation for adaptive behaviour involves innate decision-making processes in response to stress and anxiety. These innate processes are influenced by different aspects of family security, such as religion, education, land and livestock, which modify, direct and control the way in which the family reacts to stress. In other words, when a family is faced with a stress situation, the members of that family identify and orientate themselves according to their source of security in order to arrive at a decision that will result in action designed to resolve the anxiety. This stress-security theory of adaptive behaviour has been verified by statistics from a 'stress adjustment survey'. This survey shows, for example, that families with more than six head of cattle are secure and will not only develop favourable attitudes to innovations, but will also accept and practise innovations more readily than families with less than six head of livestock who are not secure. Thus the complex interrelationship between stress (with its associated feelings of anxiety) and security (with its associated feelings of confidence and assurance) gives rise to an innate reaction that motivates behaviour or social action to accommodate or resolve anxiety.[1]

A MODEL OF NUTRITIONAL STRESS

During the initial stages of research in the Que Que Tribal Trust Land, it became apparent that a measure of the stressing forces acting on the community was required in order to enable a proper investigation of the variables which influence development.

A series of agro-economic and health surveys was then conducted to measure nutritional stress acting on a representative random sample of tribal families. These surveys were specifically designed to determine the security variables important to the satisfaction of nutritional needs, and also to measure the reaction of the community to nutritional stress. An analysis of data from this survey has led to the construction of a Nutritional Stress Scale which has been extensively used for the measurement and evaluation of independent variables in influencing the nutritional status of rural families.[2]

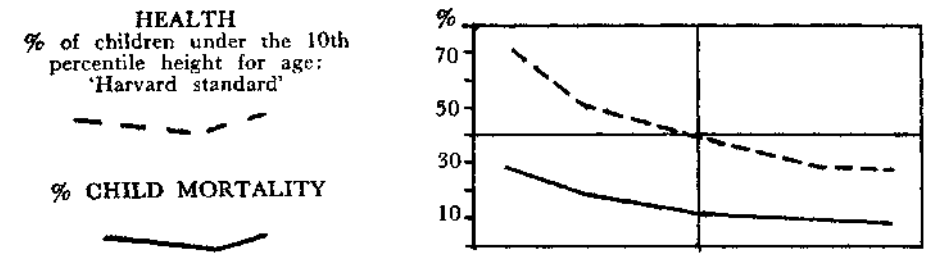
[1] Identification is an important adjustment mechanism which generally operates on a subconscious level. An example of conscious outward expression of security identification concerns the Shona custom of 'Gono (dedication of the bull)'. This practice illustrates a process of adjustment which employs identification to relate two important sources of security, livestock and religion.

[2] The construction of the Nutritional Stress Scale has been fully explained in R. J. Thaisen 'The Cultivation of Vleis in the Que Que Tribal Trust Land', (unpubl. paper, 1974).

The scale is built up from a number of factors concerning family diet, in particular the carbohydrate and protein sufficiency of the diet. Each family is initially given a dietary code which indicates its level of food sufficiency. These dietary codes are then compared with stated needs given by family heads, and also with standards of dietary needs as given in Davidson,[3] in order to categorise the families according to a simple five-point Nutritional Stress Scale with subsistence at the median point.

The use of the scale has enabled the identification of six primary variables which relate to both the nutritional and agro-economic status of the family. These variables are: the cultivation of vlei land; the possession of livestock; years of school education of the family head and his wife; family health; religion; the migration and wage earnings of family heads.[4]

In the diagram which follows the Nutritional Stress Scale is used to illustrate the linear and progressive influence of the first three variables on family nutrition, child health and child mortality.



1969/70 Drought season by scale.

		−2 Stress	−1 Stress	0 Subsistence	+1 Surplus	+2 Surplus
VLEI LAND	Mean acres used by family	0,18	0,40	0,51	0,52	1,6
	% of families owning vlei	28	44	57	83	100
LIVE STOCK	Mean L.U.[6] per family	1,7	4,0	5,5	7,0	6,8
	% of families owning stock	57	80	84	100	100
SCHOOL EDUCATION	% of literates	36	47	65	77	86
	% of heads & wives literate	43	52	73	84	100

[3] Sir Leybourne Stanley P. Davidson *et al., Human Nutrition and Dietetics* (Edinburgh, Churchill, 1973).

[4] It is interesting to note that the 'stress adjustment survey' shows that the six primary variables have a significant influence on the ability of the family to accept innovations such as irrigation and family planning. These variables also influence population growth.

[5] The health assessment is based on the height-for-age rating of school children according to the 'Harvard standards'. Children below the 10th percentile are considered malnourished and/or unhealthy. See also M. Bohdal *et al.*, 'A comparison of the nutritional indices in healthy African, Asian and European children', *Bulletin of the World Health Organisation (1969)*. 40. 166-74.

[6] L.U. = Large Unit [of Stock]; i.e. 5 goats or sheep = 1 L.U.

Children below the 10th percentile height for age vary from 71 per cent in the below-subsistence '-2' category to 25 per cent in the above-subsistence categories; while child mortality varies from 25 per cent in the below subsistence categories to 12 per cent in the above subsistence categories.[7]

Although cause and effect relationships are implied by the foregoing analysis it is important to notice that such relationships cannot be fully substantiated. For example, it could be suggested that better educated families are well adjusted and would therefore cultivate more vlei land, which could provide more money for the purchase of livestock, which would in turn mean more milk and meat and therefore healthier families. The converse, however, could also be suggested in that healthier families could have more available time and energy for farming and would therefore obtain better crop and livestock productivity with cash and draught for the cultivation of more vlei land. This could mean a higher standard of living with more money, time and incentive for family education.

The important point is that these primary variables are inter-correlated, and that a change in any one is likely to influence a beneficial or detrimental change in any other.

The following discussion indicates the significance of the nutritional stress variables to the overall development of the community.

VARIABLES OF DEVELOPMENT

Family health could be considered as a dependent variable which is effected by vlei cultivation, possession of livestock, and school education.[8] However, it is also obviously an independent variable which may cause maladjustment, especially in uneducated families. For example, a health survey that I have conducted[9] shows that members of unhealthy families generally spend considerable time and effort in determining the causes and effecting cures of child illnesses, while the stress adjustment survey shows that some of these families appear to undergo a mental regression by which the head and his wife become so obsessed with causes and cures that agricultural production takes secondary place.

An analysis of data using the Nutritional Stress Scale shows that families below the subsistence level have no surplus energy for response to external stimuli, such as the provision of proper medical attention for their children, or the practice of innovations, such as irrigation and grazing management. All available energy is turned inwards for survival and response to extension services and other agencies of change becomes impossible. These families simply do not have the necessary material, physical and mental resources to effect change. Development under these circumstances needs to be supported, with an input of resources from an external source.

A school survey also shows that health and nutrition have a significant influence on the mental ability and academic achievement of school children which could in turn influence their adjustment in later life.[10]

[7] In the 1969-70 drought season 8 per cent of families fell in the '-2' subsistence category; 29 per cent in the '-1' category, 38 per cent in the 'O' or subsistence category, 15 per cent in the '+1' above-subsistence category and 10 per cent in the '+2' category.

[8] R. J. Theisen, *Agro-Economic Factors relating to the Health and Academic Achievement of Rural School Children* (Salisbury, The Tribal Trust Areas of Rhodesia Research Foundation, 1974).

[9] The health survey was partly designed by Dr D. M. Taylor, Government Medical Specialist, General Hospital, Gwelo.

[10] Theisen, *Agro-Economic Factors*. The School survey was conducted in 1972 through a field liaison between the Department of Health (Dr J. C. A. Davies) and the University of Rhodesia.

School education is an important variable of development. The critical point in the education of women lies at literacy or semi-literacy when at least three years of school education have been achieved. At literacy women show a marked ability for adjustment and are much more likely to practise agricultural innovations such as the use of fertilizer and kraal compost to improve crop yields. Therefore literacy in married women is associated with a significant improvement in crop yields and family nutrition. Once literacy has been achieved, however, further education is not very significant until secondary school (Grade 8), is reached, whereupon western-orientated social attitudes and ideals become important in respect of matters such as family planning and the cash economy. In the Que Que Tribal Trust Land, 61 per cent of married women are literate.

The critical point in the education of men is not reached until six years of school education has been achieved. At this level attitudes and practices relating to the acceptance of agricultural innovations such as irrigation and grazing management become significant. By comparison to women, it is apparent that men are less concerned with agricultural production and more concerned with wage earnings. For this reason agriculturally orientated attitudes and motives can be expected to develop at a later stage in the education continuum. In the Que Que Tribal Trust Land, 74 per cent of men (family heads) are literate while 26 per cent have achieved six or more years of school education.

The sum of school education of the family head and his wife, 'family education', has proved a most useful statistic in the evaluation of educational influences in respect of development variables. For example, it can be shown that family education is significantly related to crop yields, family nutrition and health family size, attitude to agricultural innovations, and family planning.

Migration of family heads. The stress adjustment survey shows that the absence of the male head of the family over long periods of time has a serious affect on the ability of the family to adjust. The stress and such loss of cohesion of the family caused by the absence of the head gives rise to a degree of functional disorganization within the family. For example, the wife may suddenly find herself unable to cope with added responsibilities such as making kraal compost and dealing with stock which are traditionally a man's work. This results in a reduction in crop yields which has a significant influence on the nutrition and health of the family. In fact the agro-economic survey shows that there is a 40 per cent reduction in crop yields when the family head is absent for more than nine months of the year. This survey also shows that the absence of the family head results in the development of negative or undefined attitudes to the acceptance of innovations and even to sending children to school (significant at less than .01 by rank analysis).

Cultivation of vlei land. This land has a high seasonal water-table that limits natural vegetation to short grassland. Vlei land is also low-lying and fertile, and the high moisture status of the soil not only enables some form of cropping throughout the year, but also provides an insurance against drought. Vlei land is usually planted to green mealies early in September and then intercropped with rice when the first rains set in. By January or February most of the green mealie crop is harvested and sold in Gwelo and Que Que. The stover is then removed from the land for livestock feeding. This enables the rice to grow and mature under optimum conditions when the water-table is generally within an inch or two of the soil surface. During winter the vlei is planted to vegetables, usually for home consumption.

About 60 per cent of families cultivate vlei land. The average holding cultivated is 1,1 acres, and the yield per acre is generally five times greater than that obtained from dry-land holdings.

During the 1969-70 drought season 84 per cent of vlei-land cultivators produced sufficient crops for subsistence requirements, while only 21 per cent of dry land cultivators produced their subsistence needs. Furthermore the whole crop economy is based on vlei cultivation which, in 1969-70, brought in a cash return per acre of Rh$14,50 as compared with a return per acre of Rh$0,58 from dry-land holdings. Data from the agro-economic survey shows that in a drought season the health of the family head and his wife as defined by the number of illnesses and days of house rest is significantly related to the cultivation of vlei land, as also is the health of school children.[11]

Livestock is an important source of security to the family. Stock provides the family with meat and milk; with draught, for the haulage of compost and anthill and for early ploughing and planting; and kraal compost which is essential for the maintenance of soil fertility and crop yields. The agro-economic survey shows that a minimum of 6 L.U. is required to ensure subsistence nutrition, and that crop yields are directly related to the possession of livestock. During the 1969-70 drought season families with less than 2 L.U. (29 per cent) applied an average of 2,8 scotch carts of manure and anthill to their arable lands which gave an average harvest of only 347 kg of grain per family and 85 kg of grain per acre; while families with 6 L.U. or more (38 per cent) applied an average of 21 scotch carts of manure and anthill to their arable holdings and achieved an average crop harvest of 1053 kg per family giving a yield per acre of 155 kg of grain.[12] The agro-economic survey shows that family health is also directly related to possession of livestock.

Religion is a significant and interesting variable of family nutrition and agricultural production, but it cannot be fully discussed in this research report. It is, however, interesting to note that members of certain religious denominations which have strong internal cohesion, such as the Seventh Day Adventists and the Salvation Army, persistently obtain better crop yields than do members of the less cohesive denominations. This could be partly due to the fact that Seventh Day Adventists and the Salvation Army have a more effective agricultural policy by comparison to less cohesive denominations. Also the members of these two churches consume very little beer, while beer drinking by the general population often becomes excessive, especially in times of stress.

[11] A full analysis has been given in Theisen, 'The Cultivation of Vleis in the Que Que Tribal Trust Land'. 'Dry-land cultivators' refer to families who only cultivate dry-land holdings and who rely on rainfall rather than on subterranean moisture for production. 'Vlei-land cultivators' are families who normally cultivate both vlei land and dry land.

[12] Anthill improves soil fertility and crop yields in that it forms an important source of colloidal material and mineral salts, and it also has a neutralizing effect on the acid sandy soils which form 90 per cent of the arable.

CONCLUSION

From the foregoing discussion it becomes obvious that the six primary variables which influence the nutrition and agro-economic status of the family are vitally important to development since they provide the family with the essential material and mental resources required for adaption and adjustment. These security variables also influence population growth, as I hope to show in a later research report.

The overall analysis suggests that the rapid development of subsistence and especially below subsistence communities cannot be achieved through the official Government Policy of Community Development, which is based on principles of 'self-help' and which is largely innitiated and actioned by the people themselves. Severely stressed families simply do not have the material, physical and mental resources for this form of development to be successful. A new dynamic approach is therefore required for the development of stressed communities. Such an approach could be referred to as Supported Development in that the initiative and input of resources would come from outside the community rather from within.

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